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## PATENT COOPERATION TREATY

## PCT

## INTERNATIONAL PRELIMINARY EXAMINATION REPORT

(PCT Article 36 and Rule 70)

Applicant's or agent's file reference 116667	<b>FOR FURTHER ACTION</b>	See Notification of Transmittal of International Preliminary Examination Report (Form PCT/IPEA/416).
International Application No. <b>PCT/AU2003/001547</b>	International Filing Date (day/month/year) 20 November 2003	Priority Date (day/month/year) 20 November 2002
International Patent Classification (IPC) or national classification and IPC Int. Cl. <sup>7</sup> A61B 3/107		
Applicant CLEARMARK TECHNOLOGIES PTY LTD et al		

1. This international preliminary examination report has been prepared by this International Preliminary Examining Authority and is transmitted to the applicant according to Article 36.
2. This REPORT consists of a total of 3 sheets, including this cover sheet.  
☒ This report is also accompanied by ANNEXES, i.e., sheets of the description, claims and/or drawings which have been amended and are the basis for this report and/or sheets containing rectifications made before this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions under the PCT).

These annexes consist of a total of 1 sheet(s).

3. This report contains indications relating to the following items:

- |      |                                     |   |
|------|-------------------------------------|---|
| I    | <input checked="" type="checkbox"/> | Basis of the report   |
| II   | <input type="checkbox"/>            | Priority  |
| III  | <input type="checkbox"/>            | Non-establishment of opinion with regard to novelty, inventive step and industrial applicability  |
| IV   | <input type="checkbox"/>            | Lack of unity of invention  |
| V    | <input checked="" type="checkbox"/> | Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement |
| VI   | <input type="checkbox"/>            | Certain documents cited   |
| VII  | <input type="checkbox"/>            | Certain defects in the international application  |
| VIII | <input type="checkbox"/>            | Certain observations on the international application   |

Date of submission of the demand 17 June 2004	Date of completion of the report 29 November 2004
Name and mailing address of the IPEA/AU AUSTRALIAN PATENT OFFICE PO BOX 200, WODEN ACT 2606, AUSTRALIA E-mail address: pct@ipaustalia.gov.au Facsimile No. (02) 6285 3929	Authorized Officer  <b>SOOSA GNANASINGHAM</b> Telephone No. (02) 6283 2172

**I. Basis of the report****1. With regard to the elements of the international application:\***

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☐ the international application as originally filed.☒ the description, pages 1- 3, 5-6 , as originally filed,  
pages , filed with the demand,  
pages 4, received on 8 October 2004 with the letter of 8 October 2004.☒ the claims, pages 7- 9 , as originally filed, -  
pages , as amended (together with any statement) under Article 19,  
pages , filed with the demand,  
pages , received on with the letter of☒ the drawings, pages 1/2- 2/2, as originally filed,  
pages , filed with the demand,  
pages , received on with the letter of☐ the sequence listing part of the description:

pages , as originally filed

pages , filed with the demand

pages , received on with the letter of

**2. With regard to the language, all the elements marked above were available or furnished to this Authority in the language in which the international application was filed, unless otherwise indicated under this item.**

These elements were available or furnished to this Authority in the following language which is:

☐ the language of a translation furnished for the purposes of international search (under Rule 23.1(b)).☐ the language of publication of the international application (under Rule 48.3(b)).☐ the language of the translation furnished for the purposes of international preliminary examination (under Rules 55.2 and/or 55.3).**3. With regard to any nucleotide and/or amino acid sequence disclosed in the international application, the international preliminary examination was carried out on the basis of the sequence listing:**☐ contained in the international application in written form.☐ filed together with the international application in computer readable form.☐ furnished subsequently to this Authority in written form.☐ furnished subsequently to this Authority in computer readable form.☐ The statement that the subsequently furnished written sequence listing does not go beyond the disclosure in the international application as filed has been furnished.☐ The statement that the information recorded in computer readable form is identical to the written sequence listing has been furnished**4. ☐ The amendments have resulted in the cancellation of:**☐ the description, pages☐ the claims, Nos.☐ the drawings, sheets/fig.**5. ☐ This report has been established as if (some of) the amendments had not been made, since they have been considered to go beyond the disclosure as filed, as indicated in the Supplemental Box (Rule 70.2(c)).\*\***

\* Replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report since they do not contain amendments (Rules 70.16 and 70.17).

\*\* Any replacement sheet containing such amendments must be referred to under item 1 and annexed to this report

**V. Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement****1. Statement**

Novelty (N)	Claims 1- 21	YES
	Claims	NO
Inventive step (IS)	Claims 1- 21	YES
	Claims	NO
Industrial applicability (IA)	Claims 1- 21	YES
	Claims	NO

**2. Citations and explanations (Rule 70.7)****NOVELTY (N) & INVENTIVE STEP (IS) Claims 1- 21**

WO 2002082980 A2  
WO 2001077739 A2  
WO 1998006320 A  
WO 1989001756 A

None of the citations individually or in obvious combination disclose the invention of the above claims. Particularly, none of the citations disclose that the stationary patterns are of slits of light in ordered succession. Claims 1- 21 are therefore are novel and inventive and satisfy the PCT criteria 33(2)-(3) for novelty and inventive step.

All of claims 1-21 are industrially applicable.

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AMT 34 AMDT

Referring now to Fig. 2, each emitter 5 comprises a tube 51 having an LED holder 52 and an electrical panel 53 at the remote end, and a lens 54 at the end closest to point 10. Six 5mm LEDs 55 are mounted in separate channels 56 through LED holder 52. A layer of stereo lithography material 58, tinted to be opaque, is mounted to the end of the LED holder 52. A distance, say 100mm, of twice the focal length of lens 54 extends between the layer of stereo lithography material 58 and lens 54.

Each channel 56 in the LED holder 52 collimates the light from the LED mounted in that channel. Slit-like openings in the stereo lithography material at the end of each channel have a draft of 60° to produce a knife edge slit 59 that is 0.2mm wide. Light from LED 55 passes through knife edge slit 59 to produce a light slit 60 that is 24mm wide. Lens 54 reduces the slit of light 60 from 24mm wide to 15mm wide for projection 62 onto the eye 100; as shown in Fig. 3. Light slit 62 is a vertical slit, relative to eye 100, and it is 15mm wide. The image of slit 62 projected on the eye is captured by video camera 15.

In total there are forty-eight LEDs 55 and they are all wired to electrical panels 53 at the remote end of the light tubes 51 so that they can be individually turned on and off under the control of the computer indicated schematically at 30. Should all the LED's be turned on at once they would project over the entire visible surface of the cornea in a pattern of both horizontal and vertical contiguous slits.

A significant amount of time may be devoted to the positioning of the light emitters, so that the entire corneal surface will be covered. Optimal resolution will be achieved when each part of the cornea is measured by at least one slit projection.

The topographer 1 is mounted on a conventional ophthalmic assessment stand (not shown), which supports the patient's head on a head and chin rest. The device is mounted so that its position is under the control of a mechanical joystick, allowing back and forth movement for focus, left and right movement to move from one eye to the other, and smaller horizontal and vertical movements to centre the device in front of the eye being assessed.

In use, the topographer is aligned in front of the eye so that the light slits are properly focussed on the cornea, and so that the camera image is in focus. A single or series of LEDs or other lights will be mounted near the camera to which the patient must fixate.

INTERNATIONAL SEARCH REPORT

International application No.  
PCT/AU2003/001547

A. CLASSIFICATION OF SUBJECT MATTER

Int. Cl. <sup>7</sup>: A61B 3/107

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)  
DWPI and keywords: cornea, eye, shape, light, image, capture, irregularity and similar terms.

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	WO 2002082980 A2 (LASERSIGHT TECHNOLOGIES INC) 24 October 2002 Whole document, particularly page 5 paragraph 4 lines 5-12, page 6 paragraph 2, and page 8 paragraphs 4-5.	1- 21
Y	Whole document	1- 21
Y	WO 2001077739 A2 (JEAN et al) 18 October 2001 Whole document, particularly page 12 lines 8- 21.	1- 21
Y	WO 1998006320 A (XEYEX CORPORATION) 19 February 1998 Whole document, particularly page 4 lines 1- 4.	1- 21

☒ Further documents are listed in the continuation of Box C

☒ See patent family annex

\* Special categories of cited documents:

"A" document defining the general state of the art which is not considered to be of particular relevance

"E" earlier application or patent but published on or after the international filing date

"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)

"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art

"&" document member of the same patent family

Date of the actual completion of the international search  
20 February 2004

Date of mailing of the international search report  
1 MAR 2004

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# INTERNATIONAL SEARCH REPORT

International application No.  
PCT/AU2003/001547

C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	WO 1989001756 A (EL HAGE) 9 March 1989 Whole document, particularly page 8 paragraph 2 lines 7- 17.	1- 21
A	WO 2002049506 A1(SMART EYE AB) 27 June 2002 Whole document	1- 21
A	WO2002028272 A1 (JOHNSON & JOHNSON VISION CARE) 11 April 2002 Whole document	1- 21
	NOTE: For the Y indication, WO 2001082980 can be combined with any one of WO 2001077739, WO 1998006320 or WO 1989001756.	

# INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No.

PCT/AU2003/001547

This Annex lists the known "A" publication level patent family members relating to the patent documents cited in the above-mentioned international search report. The Australian Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

Patent Document Cited in Search Report			Patent Family Member				
WO	02082980	US	2002044258	US	2002154269	WO	03034910
WO	0177739	AU	60197/01	EP	1274341		
WO	9806320	AU	38264/97	CA	2263249	EP	0955861
		US	5873832	US	6059773	US	6206522
		US	6447119				
WO	8901756	EP	0329757	US	4978213	US	5227818
WO	0249506	AU	16567/02	EP	1349487		
WO	0228272	AU	94623/01	CA	2424169	EP	1326525
		US	6616279	US	2004004696		
END OF ANNEX							